

The Pelagic Octopus *Tremoctopus violaceus* Delle Chiaje, 1830, from Southern Australian Waters

by

WOLFGANG ZEIDLER

South Australian Museum, North Terrace, Adelaide, South Australia, 5000 Australia

Abstract. The octopod genus *Tremoctopus* has been recorded previously from eastern Australian waters by C. C. Lu and J. U. Phillips in 1985. Locality details of these specimens are given here for the first time, and new records of specimens from Western Australia and South Australia are recorded. The two adult females from South Australia extend the range of *T. violaceus* to latitude 36°S and indicate that the Leeuwin Current, with water of tropical origin from the western Australian coast, may have a more easterly influence than previously thought.

INTRODUCTION

Octopods generally are regarded as benthic animals. However, a number of species including those of *Tremoctopus* are pelagic and have widespread distributions. *Tremoctopus* is easily distinguished by its somewhat squidlike appearance and possession of two pairs of conspicuous pores in the web at the base of the arms: one pair dorsally and another pair ventrally, adjacent to the funnel (Figure 1). The genus was revised in detail by THOMAS (1977), but no specimens were recorded from Australian waters. The first published record of *Tremoctopus* from Australia appears to be that of LU & PHILLIPS (1985) who recorded *T. violaceus* Delle Chiaje, 1830, from the eastern Australian coast ("New South Wales," p. 34) but gave no details of specimens or localities. The present paper provides details about these and other specimens. Two adult females are the first adults obtained from southern Australia and provide a substantial range extension for this broadly distributed species.

DELL (1952) recorded *Tremoctopus violaceus* from New Zealand, so its occurrence in eastern Australian waters is not surprising (ALLAN, 1945); however, the occurrence of this circumtropical species in southern Australian waters requires explanation.

MATERIAL EXAMINED

Details of Australian specimens deposited in various Australian museums follow; body measurements (Table 1) are

according to ROPER & VOSS (1983) and beak dimensions (Table 2) follow those devised by WOLFF (1984).

Australian Museum, Sydney (AM)

(1) Adult female (AM C156235), 320 mm ML, without data.

(2) Adult female (AM C516), 255 mm ML, Manly, Sydney, New South Wales, presented by H. Prince, 1894. Museum of Victoria, Melbourne (NMV)

(1) Juvenile (male?) (NMV F53416), 7.0 mm ML, approx. 160 km NE of Cairns, Queensland (15°57'S, 146°52'E), trawled in 0-850 m by RV *Lady Basten*, 5 December 1981.

(2) Juvenile (male?) (NMV F53417), 11.1 mm ML, approx. 300 km E of Swansea, New South Wales (33°12'S, 154°52'E), trawled in 0-200 m by RV *Sprightly*, 22 August 1982.

(3) Juvenile (male?) (NMV F53414), 5.4 mm ML, approx. 350 km E of Wollongong, New South Wales (34°29.5'S, 154°42.1'E), trawled in 20 m by RV *Soela*, 30 September 1981.

(4) Juvenile (male?) (NMV F53415), 30.0 mm ML, approx. 355 km E of Batemans Bay, New South Wales (35°34.6'S, 154°13'E), trawled in 20 m by RV *Soela*, 4 October 1981.

Western Australian Museum, Perth (WAM)

(1) Adult female (WAM 964.87), 265 mm ML, stranded on Shelly Beach, Albany, Western Australia, collected by J. Combe, April 1986. (Damaged).

(2) Adult female (WAM 965.87), approx. 230 mm ML,



a



b

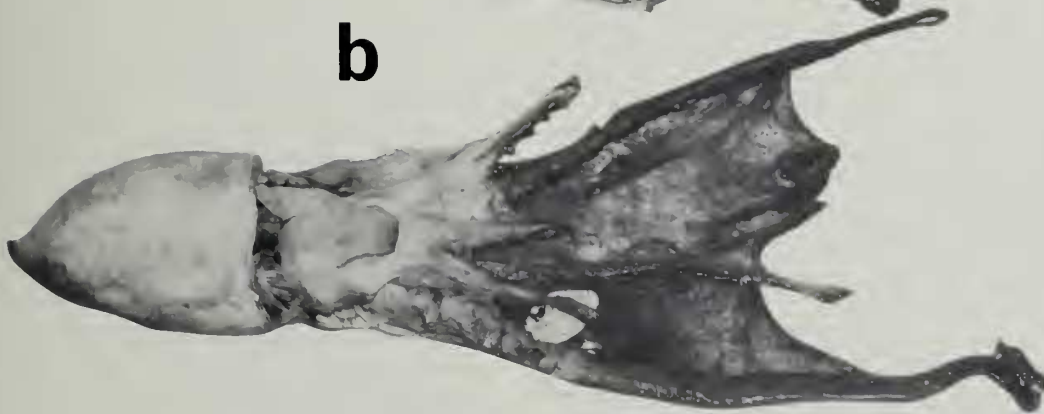


Figure 1

Tremoctopus violaceus adult females from South Australia. a, 230 mm ML, Outer Harbour (SAM D17601); b, 230 mm ML, D'Estrees Bay, Kangaroo Island (SAM D17602).

Table 1

Tremoctopus violaceus; body measurements of South Australian specimens from Outer Harbour (SAM D17601) and Kangaroo Island (SAM D17602).

Character	SAM D17601	SAM D17602
Weight (fresh)	2.75 kg	1.05 kg
Gill number	14	14
Measurement (mm)		
Total length	940	720
Mantle length (dorsal)	230	230
Mantle length (ventral)	175	180
Mantle width (maximum)	175	130
Head length	35	30
Head width	140	80
Arm length I (left/right)	410/460 (both tips missing)	330/290
Arm length II (left/right)	710/720	missing/480
Arm length III (left/right)	350/350	200 (incomplete)/missing
Arm length IV (left/right)	345/½ missing	140/150 (both incomplete)
Arm width index	23/230 (10%)	28/230 (12.2%)
Web depth A	to arm tips	to arm tips
Web depth B	to arm tips	to arm tips
Web depth C	100	damaged
Web depth D	105	110
Web depth E	60	75
Funnel length (ventral)	82	80
Free funnel length	40	45
Funnel width (at opening)	26	24
Pallial aperture	140	90
Eye diameter	18	10
Pore size, ventral (left/right)	12 × 16/10 × 17	12 × 19/12 × 17
Pore size, dorsal (left/right)	damaged/15 × 21	15 × 20/15 × 21

regurgitated by sperm whale or whale shark off Albany, Western Australia, donated by Cheyne Beach Whaling Co., 1975? (Partly decomposed).

- (3) Juvenile (male?) (WAM 344.77), 4.5 mm ML, 73 km west of Rottneest Island, Western Australia, in surface net, collected by P. Cawthorn on FRV *Lancelin*, 7 October 1962.

South Australian Museum, Adelaide (SAM)

- (1) Adult female (SAM D17601) (Figure 1a, Tables 1, 2), 230 mm ML, from midway between Section Bank and Saint Kilda, just north of Outer Harbour, South Australia (34°45'S, 138°30'E), alive in prawn trawl, collected by P. D. Vickers, 29 June 1984.
- (2) Adult female (SAM D17602) (Figure 1b, Tables 1, 2), 230 mm ML, stranded on D'Estrees Bay Beach, Kangaroo Island, South Australia (35°44'S, 137°39'E), "recently dead," collected by V. F. H. Bell, 8 March 1986.

DISCUSSION

Two subspecies of *Tremoctopus violaceus* are currently recognised (THOMAS, 1977) but they are very similar morphologically. According to Thomas "the most striking difference between these two subspecies is the number of suckers on the hectocotylized arm of the males." In *T.*

Table 2

Tremoctopus violaceus; beak dimensions of South Australian specimens from Outer Harbour (SAM D17601) and Kangaroo Island (SAM D17602).

Character	Measurement (mm)	
	SAM D17601	SAM D17602
Upper		
Hood length	17.2	15.0
Rostral length	12.0	9.8
Wing width	2.5	2.3
Rostral tip to inner margin of wing	13.2	10.0
Wing to crest length	24.5	21.9
Crest length	27.8	24.0
Jaw angle width	13.4	12.0
Lower		
Rostral tip to inner posterior corner of lateral wall	24.1	20.5
Rostral length	10.5	8.4
Rostral tip to inner margin of wing	20.9	17.6
Wing length	10.8	10.2
Jaw angle width	13.0	11.0

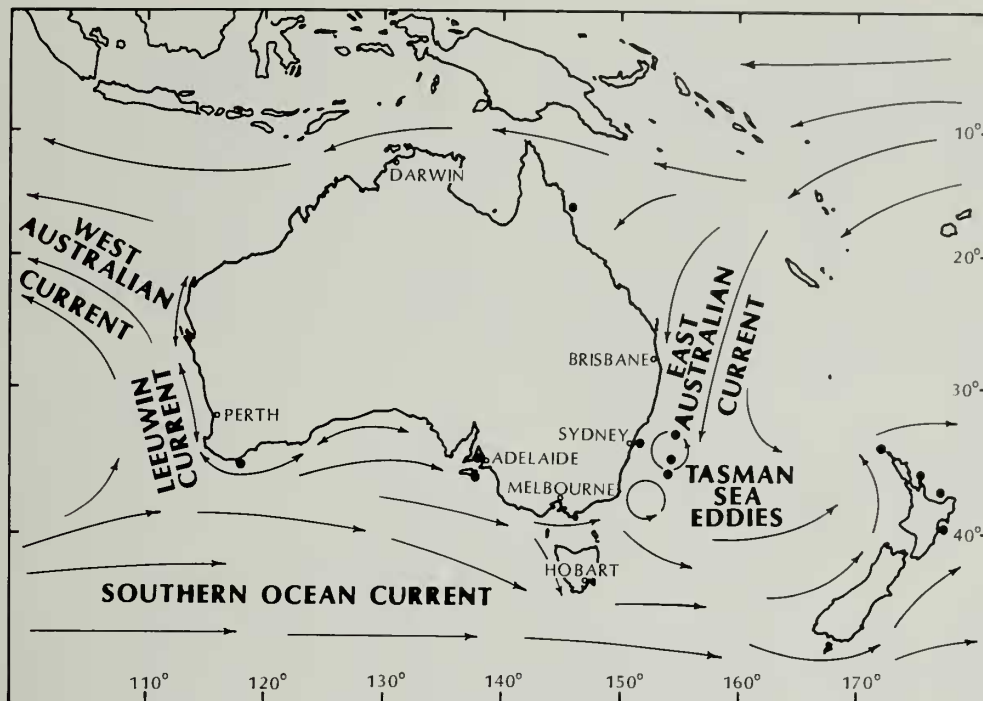


Figure 2

Major sea surface currents during winter (simplified) around New Zealand and Australia and records of *Tremoctopus* captures (●).

violaceus gracilis there are 19–22 pairs of transverse suckers on the distal portion of the arm and 27–29 pairs of suckers on the proximal portion, while *T. violaceus violaceus* has 15–19 and 22–23 pairs of suckers respectively. The females, however, are virtually identical, differing mainly in the mean number of gill filaments (13 for *T. v. violaceus* and 15 for *T. v. gracilis*) although both have the same range (13–16). Thus in the absence of males the subspecific identity of the Australian specimens cannot be confirmed, but based on the geographic distribution given for the two subspecies by THOMAS (1977) the Australian subspecies is most likely *T. v. gracilis* (Eydoux & Souleyet, 1852).

Tremoctopus violaceus is considered to be a circumtropical species (THOMAS, 1977) and even DELL's (1952) New Zealand records (Figure 2) are north of the subtropical convergence. The South Australian records thus represent a considerable range extension.

The occurrence of tropical species off New South Wales is not unexpected, as warm-core eddies are a common element of the East Australian Current and regularly carry pelagic cephalopods southward (BRANDT, 1983). However these eddies usually disintegrate before approaching Bass Strait (NILSSON & CRESSWELL, 1981) so they do not normally provide a vehicle for tropical species to reach South Australian waters. The most likely origin is from the west via the Leeuwin Current that carries water of tropical origin eastwards, predominantly in winter, and is consid-

ered responsible for the dispersal of other tropical marine species to southern Australia (MAXWELL & CRESSWELL, 1981).

The winter-time capture of the Outer Harbour specimen coincides with the presence of the Leeuwin Current. The specimen probably was attracted by the relatively warmer water of Gulf St Vincent and eventually was caught in shallow water (3–5 m) at the opening of Barkers Inlet, which carries thermally polluted water from Torrens Island Power Station. When captured it appeared to be in good condition but, judging by the digested remains of stomach contents, it had not fed recently. The specimen stranded on the southern side of Kangaroo Island probably was "lost" and could not survive the cooler waters of the Southern Ocean, *i.e.*, most likely it had been carried by the Leeuwin Current far enough southward that the temperatures had dropped below survival levels(?).

The South Australian records of *Tremoctopus* and also that of another tropical cephalopod, *Nautilus repertus* (= *N. pompilius*?) from Foul Bay, Investigator Strait (RIDDLE, 1920), indicate that the Leeuwin Current may, at times, have a more easterly influence than was previously thought.

The two South Australian specimens illustrate some interesting aspects of morphometry (Table 1). Although one specimen is more than twice the weight of the other, they both have the same mantle length. The larger specimen (SAM D17601), however, has a much greater mantle

and head width. THOMAS (1977) found that the relative width of the mantle decreases with an increase in size of small animals and later growth is isometric; also in adults, the mantle length continues to increase slightly faster than the head width. The larger South Australian specimen would thus appear to have rather wide body measurements for this species.

The stomach contents of all adult specimens were examined but were too decomposed or digested to be determined except for the South Australian specimens, which were much fresher, and the Western Australian specimen stranded on Shelly Beach. The stomach of the latter specimen (WAM 964.87) contained unidentifiable fish scales of at least two types (cycloid and ctenoid), cephalopod flesh (no beak!), and other remains. The specimen stranded on Kangaroo Island (SAM D17602) had only bits of green algae and the brown alga *Hormosira banksii* in the stomach, undoubtedly swallowed while being stranded. The stomach contents of the specimen caught near Outer Harbour (SAM D17601), however, consisted of polychaete jaws, spicules, and strands of tubular tissue that could be the intestinal lining of the same polychaete and several specimens of a trematode belonging to the Hemiuroidea. The polychaete jaws are identical to those of *Glycera americana* Leidy, 1855 (Glyceridae) which is a species that swarms around Outer Harbour in June–July coinciding with the capture of the octopus. The fact that the soft parts of the worms had been completely digested suggests that the octopus may have been in the vicinity of its capture for some time. The trematodes were immature(?) and could not be identified further; however, they belong to a group usually found in the digestive tract and stomach of marine fishes. THOMAS (1977) found that adult *Tremoctopus* fed chiefly on small fishes so this trematode could have been ingested via a fish host but there were no fish remains present and the trematodes were in good condition, suggesting that *Tremoctopus* might also be a host for these parasites.

The Western Australian specimens represent a new record for that state.

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